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Tour Guide to

BERNALILLO WATERSHED PROTECTION PROJECT

Cibola National Forest

Water filled trenches on the slopes of the Bernalillo Watershed Protection Project above Bernalillo, New Mexico, from summer storms in 1955, when work was under construction. The trenches caught surface run-off, preventing floods in the community below.

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BERNALILLO WATERSHED PROTECTION PROJECT

INTRODUCTION

The Bernalillo Watershed Protection Project in the Piedra Liza Arroyo was started in 1953 under the sponsorship of the Board of Supervisors of the Santa Fe-Sandoval Soil Conservation District, working with the Forest Service and the Soil Conservation Service of the U. S. Department of Agriculture.

Bernalillo, like many other communities in New Mexico, has been subjected to flood damage from summer storms falling on nearby slopes. Evidence on the ground indicated that much of the flood water came from the foothills of the Sandia Mountains and gentle sloping mesa lands to the east of Bernalillo.

The purpose of the project was to improve watershed conditions so that the soil would be held on the hillsides and most of the rainfall put into the ground to bring back the grass cover. Before the project was started, there was very little grass or shrubs on the watershed. The area had been grazed by livestock for hundreds of years and grazed too heavily because of its closeness to the little villages along the Rio Grande.

The cooperative program between agencies of the U. S. Department of Agriculture and local people called for constructing a 250 acre foot detention dam in Piedra Liza arroyo and installing land treatment measures on the national forest portion of the watershed. The Soil Conservation Service planned and contracted for the construction of the dam. The Forest Service treated National Forest lands involved in the project.

From July 27 to August 1, 1955, over 4 inches of rain fell on the area. One storm produced 1.25 inches in twenty minutes. Arroyos on each side of the treated area produced floods but none came from the treated watershed. During the period this was the only non-flood producing arroyo between Albuquerque and Algodones (to the north) and some of them flooded two or more times. Another intense storm fell on the area on July 19, 1956, and deposited 1.38 inches of rain in the first twenty minutes. An additional .50 inches fell during the next hour.

The land treatment measures by the U. S. Forest Service were designed to stop the rain where it fell and let it sink into the ground instead of running over the surface into the arroyo. Thirteen hundred acres of National Forest land were treated. The detention dam is the only structure located in the arroyo channel.

Land treatment measures were designed to handle the small storms from the National Forest portion of the watershed. The detention dam was constructed to handle the occasional large storm and the water originating on the untreated portions of the watershed.

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WATCH YOUR FOOTING. THE LAND IS ROUGH IN SPOTS.

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STOP NO. 1 Sandia Pueblo Underpass

Flood water closes the highway here several times each year. When a summer storm falls on the denuded mesa lands east of the Santa Fe Railway tracks the runoff comes through the underpass and collects in the highway. It fills this area covering the highway for about 1/2 mile. Traffic cannot go through and must detour.

The water stands on the highway and land to the west until it sinks. The high bank, 7 or 8 feet higher than the land, is dirt and sand scraped off the highway and pushed to the sides. Notice that the fence posts here are higher than the fence to the north.

STOP NO. 2 Flooded Highway and Church Grounds at Bernalillo

Flood damage from the watershed before the project was started, destroyed the 100-year old convent and did heavy damage to homes, farms, and orchards in the path of the flood. While the exact amount of damage was not accurately determined, it cost $130,000 to build a new convent. The people of Bernalillo pledged themselves to sponsor this small watershed program for work done on their farms and private lands. However, the work we will see today on the National Forest is paid for from U. S. Forest Service appropriations.

Flooded highways were a common sight where the Piedra Liza flowed to the Church grounds. Note stalled cars.

Flood waters standing in Church courtyard.

STOP NO. 3 Jemez Flood Control Dam

This is a silt and flood control dam designed to withhold flow of silt and sediment into the Rio Grande above Albuquerque. It costs money to build a dam to hold silt that comes off the land, and that portion of the Jemez Reservoir designed to hold silt has cost $8.40 for each acre of land above the dam. This is not a permanent cure, since work on the watershed itself is not being done.

The Jemez Dam is 780 feet long and 135 feet high. The Reservoir capacity is estimated at 120,000 acre feet, of which 90,000 acre feet is for silt and sediment, and 30,000 acre feet for flood control. The Reservoir covers 2,885 acres and the project cost approximately $7,000,000.00.

Return to the "Y" at Bernalillo and proceed east on Highway 44 toward Placitas.

STOP NO. 4 Detention Dam at Piedra Liza Arroyo

You are now approaching the Bernalillo Small Watershed Project and the Detention Dam built across the mouth of the Piedra Liza. This earth dam built by the Soil Conservation Service, is 1030 feet long and 35 feet high. The reservoir holds 250 acre feet of water (that is equal to one foot of water over 250 acres of land).

This is NOT a water storage reservoir. All flood water is owned by water users in the Rio Grande Valley so the dam has an open gate. Flood waters rushing into the reservoir are impounded until the water can run out through the 24" open gate in the dam. The water can be drained out in 36 to 72 hours, depending on the size of the flood. Usually summer floods run large volumes of water for an hour or two. If the water can be caught in a reservoir and allowed to drain off as a small stream, no damage to valuable property will result. The water can be channeled into drain and irrigation ditches where it can be used.

Unfortunately, no provision has been made by the ditch owners to take these flood waters into existing ditches. While the Piedra Liza Arroyo is one of the flood drainages into Bernalillo, there are others above and below the town which bring water into the valley area and can still cause flooding in Bernalillo.

Floodwaters impounded behind dam after July, 1956 storm

Water flowing out of gate outlet at full capacity

STOP NO. 5 Entrance Gate to Cibola National Forest Bernalillo Watershed Protection Project

You will see several gullies along the road. They were once roads that were allowed to wash out because no provisions were made to prevent water running down the wheel tracks. As we drive through the Project, you will see that in most places erosion control structures are functioning. This was accomplished by a number of methods:

1. Terraces: Level terraces were constructed with a road grader. They are about a foot deep and the soil removed forms a dike on the lower side of the structure. Cross bars in the terraces prevent flow and will prevent general overtopping and washing when a big storm occurs. The terraces will impound the runoff from the area between the structures.

2. Pitting: Most of the flatter portion of the watershed has been pitted by using an ordinary farm disk. The implement cuts out a shallow basin two feet long and about eight inches wide. These depressions are intended to catch the rainfall so it will soak into the soil where it is available for plant growth.

3. Chiseling: The most effective treatment from the standpoint of putting moisture into the ground is the chiseling operation. A road ripper with teeth about 20 inches long was used. The teeth are about six feet apart and long enough to open up the subsoil so water can percolate through it.

4. Steep Slope Terraces: A few miles of steep slope terraces were built as an experiment. These structures demonstrated that they could hold more than 15 inches of water. This amount was accumulated during 2.5 inch rainfall and they were not filled. The rilling of the mountainside stops at the edge of the upper terrace, so they are effective in checking erosion.

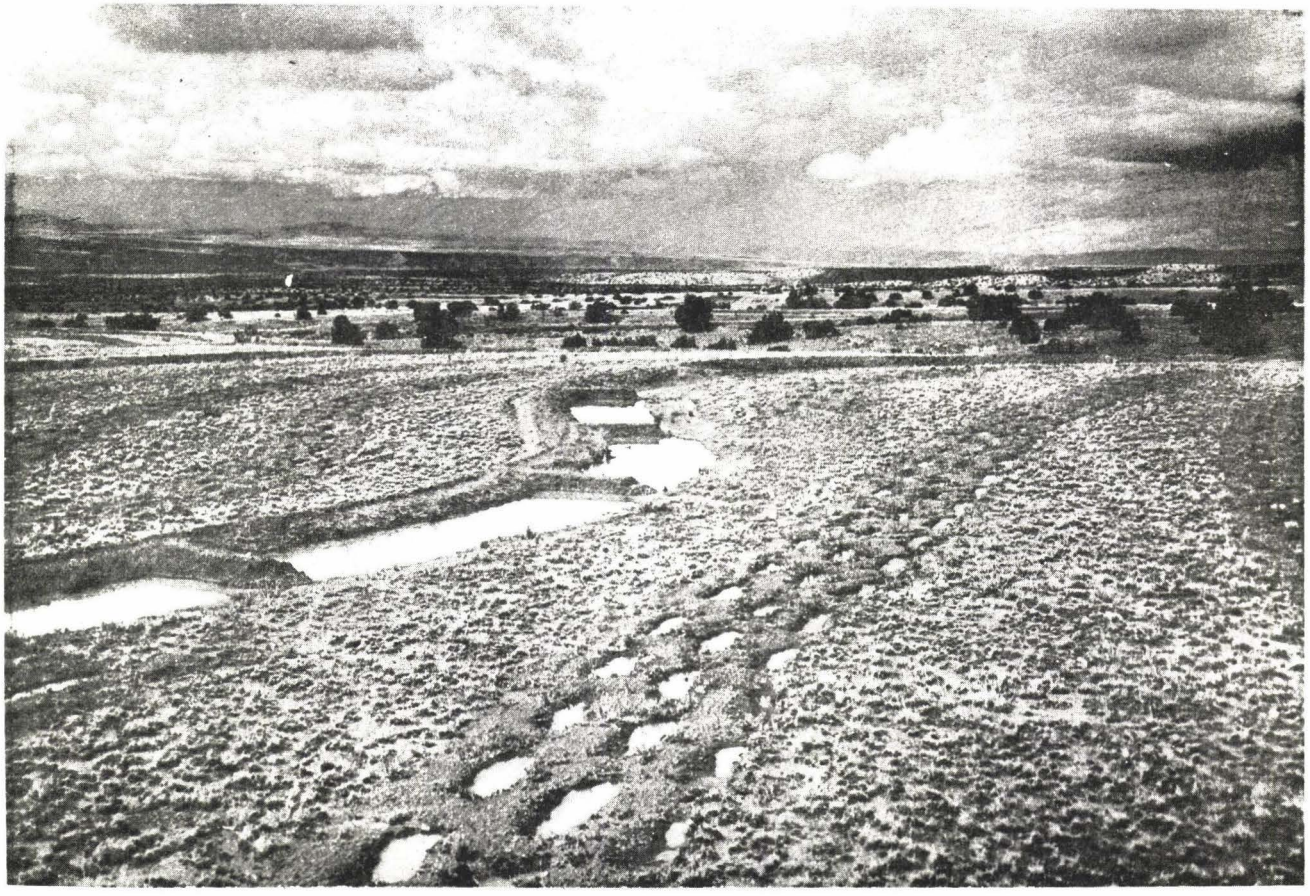
5. Gully Control: Juniper trees have been cut and placed in shallow gullies and old wagon roads that have been eroded. The trees slow the flow of water and trap the soil and act to stabilize it so vegetation can be established.

All of the foregoing measures are considered to be temporary but sufficient to hold moisture so vegetation can grow and give the necessary protection. Livestock have been excluded from the area since 1950.

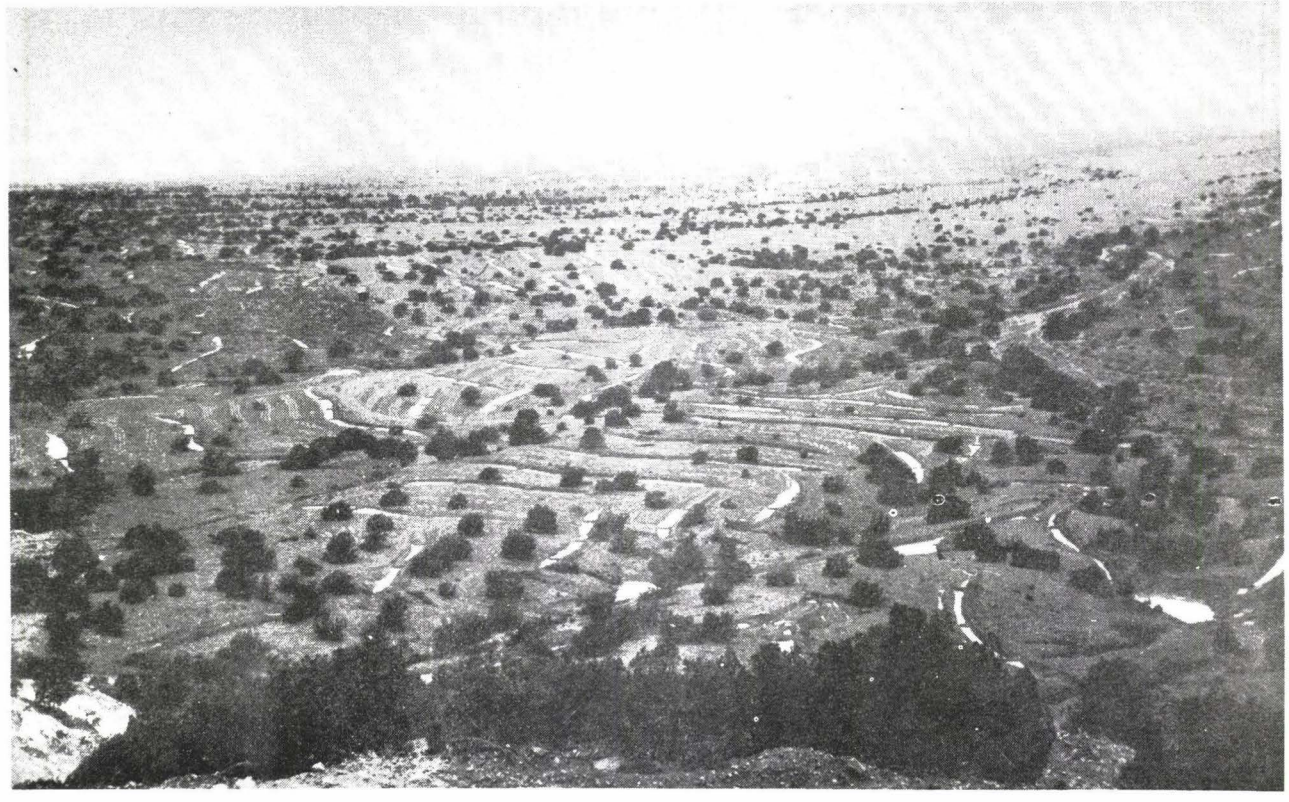
By slowing down the water running down a hillside, erosion is reduced and flood damage to the farmlands and communities along the lower part of the watershed is prevented.

All areas disturbed during the construction of the terraces and land treatment were seeded to grasses suitable to the area. Chamiza and other soil holding shrubs were planted by Albuquerque Cub Scouts as their conservation contribution.

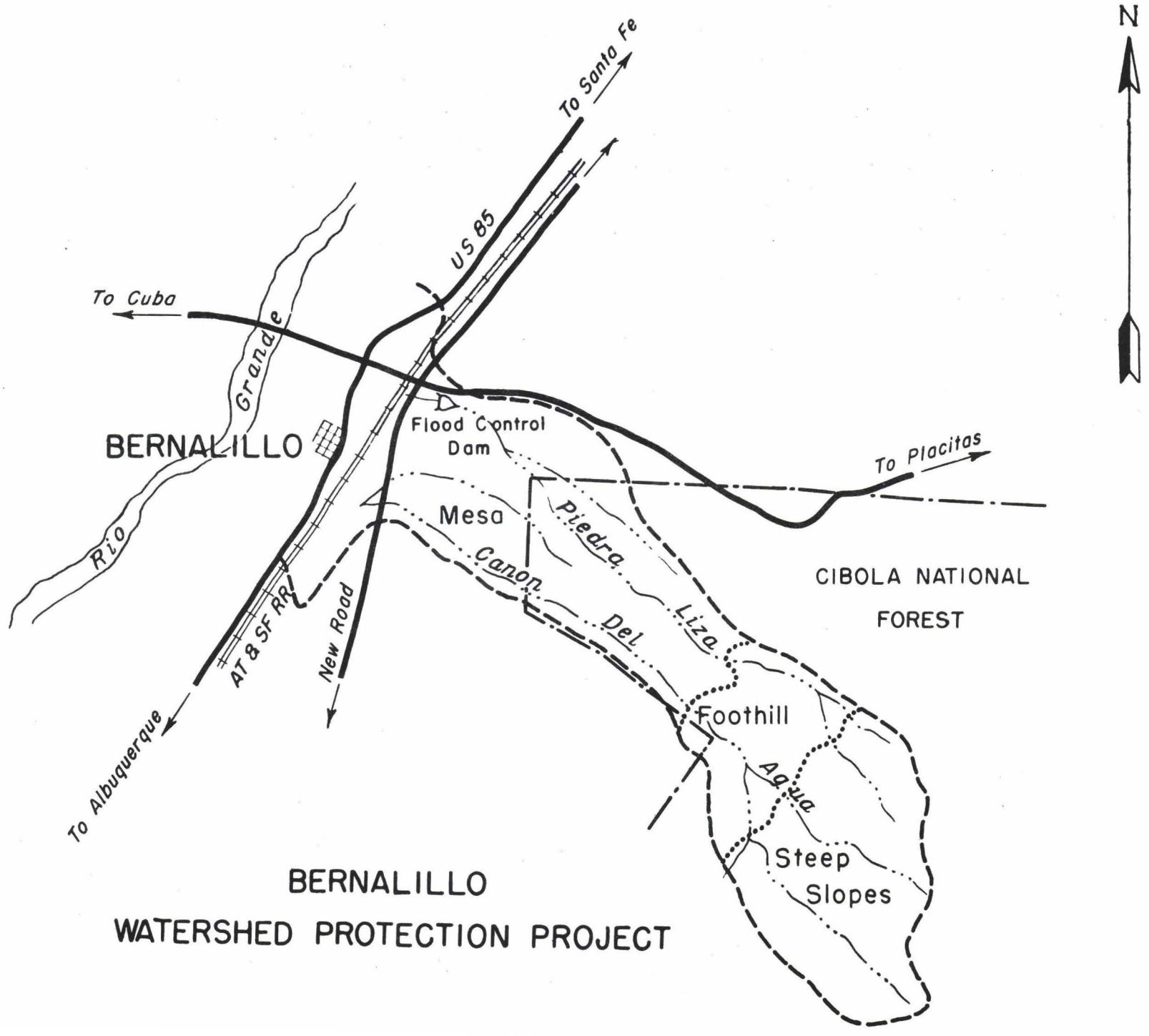
Work on this Project started in February, 1954 and was completed by September, 1955.



Terraces, pitting and deep ripping were sometimes used together to prevent water from running off the land. If rain or snow water sinks into the ground where it falls, it produces good vegetative ground cover instead of damaging floods. The Bernalillo project was planned to hold the water where it fell, thus making full use of scanty annual precipitation. Improved vegetation will finally do what the trenches and pitting are now doing.



Water filled trenches on the mesa slopes above Bernalillo present an interesting pattern. Without these trenches water runs into the arroyos, carrying top soil and creating floods that do so much damage in the valley and town.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US 85
To Cuba
Rio Grande
BERNALILLO
Flood Control Dam
To Placitas
Mesa
Piedra Liza
Canon Del
CIBOLA NATIONAL FOREST
AT & SF RR
New Road
To Albuquerque
Foothill
Agua
Steep Slopes
BERNALILLO
WATERSHED PROTECTION PROJECT